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ART 34 AADT**Claims**

1. A method for preparing a photocatalyst containing titanium dioxide, **characterised** in that from an acid solution containing titanium oxysulphate at a temperature under the boiling point of the solution is precipitated by addition of crystal nuclei a sulphurous titanium dioxide hydrate precipitate, said precipitate being separated and subsequently subjected to thermal treatment in order to obtain a crystalline sulphurous product.
2. A method as defined in claim 1, **characterised** in that the precipitation is conducted without addition of base.
3. A method as defined in claim 1 or 2, **characterised** in that the precipitation is conducted in a temperature range from 70 to 100 °C.
4. A method as defined in claim 3, **characterised** in that the crystal nuclei are anatase.
5. A method as defined in any of the preceding claims, **characterised** in that the precipitate separated from the solution is calcinated in air in the temperature range from 100 to 500 °C, preferably 200 to 500 °C.
6. A method as defined in any of the preceding claims, **characterised** in that the solution containing titanium oxysulphate is obtained by reacting ilmenite and sulphuric acid, by dissolving the sulphate thus formed and by removing at least part of the iron from the solution by reduction into ferrous form and crystallisation.
7. A method as defined in claim 6, **characterised** in that ferric iron is left in the solution, so that the titanium dioxide hydrate precipitate obtained contains iron.
8. A method as defined in any of the preceding claims, **characterised** in that a chromium(III) compound is added to the precipitate before the thermal treatment.
9. A method as defined in any of the preceding claims, **characterised** in that an iron compound is added to the precipitate before the thermal treatment.

10. A photocatalyst containing titanium dioxide, **characterised** in that the crystalline particulate product has a specific surface area in the range from 100 to 250 m²/g and that the product contains 0.3 to 5%, preferably 0.5 to 4% and most preferably 1 to 4% of sulphur.

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11. A photocatalyst as defined in claim 10, **characterised** in that the major portion of titanium dioxide is in anatase form.

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12. A photocatalyst as defined in claim 10 or 11, **characterised** in that the product contains 0.05 to 2% of chromium, preferably 0.1 to 1%, and 0.05 to 0.3% of iron, preferably 0.1 to 1.5%.

13. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst operating at visible light wavelengths.

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14. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst in the decomposition of organic compounds or microorganisms.

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15. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst in a coating composition.